

1. A gas flow meter comprising:

- a noise reduction circuit for reducing external noise; and

wherein said gas flow meter outputs a voltage signal based on the signal adjusted by the digital adjusting circuit.

- a digital conversion circuit for converting an output from the gas flow detection circuit into a digital signal;

a regulator circuit for supplying a reference voltage to the digital conversion circuit and/or the adjusting means.

- a gas flow detection circuit for detecting a gas flow passing through a gas passage;

a noise reduction circuit including an overvoltage protection circuit and supplying to the gas flow detection circuit and the adjusting circuit a voltage whose surges and overvoltages applied to a power supply terminal are reduced;

4. The gas flow meter according to claim 3, wherein in one of the voltage supply paths for supplying a voltage having reduced surges and overvoltages to various circuits, a voltage limiter circuit that turns on when applied with a voltage in excess of a predetermined voltage is connected between a voltage supply terminals and a ground terminal and a current limiting resistor is connected between the power supply terminal and the voltage supply terminals;

an overvoltage protection circuit is provided in which a diode is connected between each of the

5. The gas flow meter according to claim 3, wherein in all of said voltage supply paths for supplying a voltage having reduced surges and overvoltages to various circuits, a voltage limiter circuit that turns on when applied with a voltage in excess of a predetermined voltage is connected between voltage supply terminals and a ground terminal and a current limiting resistor is connected between the power supply terminal and the voltage supply terminals; and

6. The gas flow meter according to claim 4, further including an overvoltage protection circuit having an additional diode connected between the voltage supply terminals and the ground terminal.

8. The gas flow meter according to claim 3, wherein a part or all of devices included in said overvoltage protection circuit, said gas flow detection circuit and said adjusting circuit are formed in a common integrated circuit.

10. The gas flow meter according to claim 4, wherein two voltage supply paths are provided; and a circuit connected to a higher supply voltage is an operational amplifier in the gas flow detection circuit and a circuit connected to a lower supply voltage is a regulator that supplies a voltage to the digital adjusting circuit.

11. The gas flow meter according to claim 5, wherein two voltage supply paths are provided; and a circuit connected to a higher supply voltage is an operational amplifier in the gas flow detection circuit and a circuit connected to a lower supply voltage is a regulator that supplies a voltage to the digital adjusting circuit.

12. The gas flow meter according to claim 6, wherein two voltage supply paths are provided; and a circuit connected to a higher supply voltage is an operational amplifier in the gas flow detection circuit and a circuit connected to a lower supply voltage is a regulator that supplies a voltage to the digital adjusting circuit.

14. The gas flow meter according to claim 8, wherein two voltage supply paths are provided; and a circuit connected to a higher supply voltage is an operational amplifier in the gas flow detection circuit and a circuit connected to a lower supply voltage is a regulator that supplies a voltage to the digital adjusting circuit.

an adjusting circuit for adjusting the voltage output from the gas flow detection circuit;

wherein an input range of the voltage signal entered into the adjusting circuit is divided in two or more and, in each divided range, a different adjustment calculation formula is set in advance;

wherein said gas flow meter further comprises means for selecting the adjustment calculation formula according to an input value of the voltage signal entered into the adjusting circuit and performing

16. The gas flow meter according to claim 15, wherein the adjusting circuit is a digital adjusting circuit which digitally adjusts the signal representing the detected gas flow and outputs the adjusted signal.

18. The gas flow meter according to claim 16, wherein the adjusting circuit has input/output characteristics represented by each of the adjustment calculation formulas expressed as a first-degree function of $y = a \cdot x + b$ where x is an output value of the gas flow detection circuit, i.e., input value for the adjustment calculation, y is an output of the adjustment calculation, and a and b are adjustment coefficients.

a digital conversion circuit for converting
an output of the temperature sensor into a digital

wherein said adjusting circuit also uses the output of the temperature sensor in performing the adjustment calculation.

a temperature sensor; and

a digital conversion circuit for converting an output of the temperature sensor into a digital value;

21. The gas flow meter according to claim 17,
further including:

a temperature sensor; and

a digital conversion circuit for converting an output of the temperature sensor into a digital value;

wherein said adjusting circuit also uses the output of the temperature sensor in performing the adjustment calculation.

22. The gas flow meter according to claim 18,
further including:

a temperature sensor; and

a digital conversion circuit for converting an output of the temperature sensor into a digital value;

26. The gas flow meter according to claim 18,

wherein said adjusting circuit has an input/output characteristic expressed by

$$y = (a1 \cdot t + a2) \cdot x + (b1 \cdot t + b2)$$

where x is an output value of the gas flow detection circuit, t is an output value of the temperature sensor, and a1, a2, b1 and b2 are adjustment coefficients.

27. The gas flow meter according to claim 17, wherein said adjusting circuit includes a programmable storage device wherein the adjustment coefficients a, a1, a2, b, b1 and b2 are written into.

28. The gas flow meter according to claim 17 or 13, wherein the adjusting circuit includes an erasable and programmable storage device wherein the adjustment coefficients a, a1, a2, b, b1 and b2 are written into.

29. The gas flow meter according to claim 18, wherein said adjusting circuit includes an erasable and programmable storage device wherein the adjustment coefficients a, a1, a2, b, b1 and b2 are written into.

30. The gas flow meter according to claim 19, wherein said adjusting circuit includes an erasable and programmable storage device wherein the adjustment coefficients a, a1, a2, b, b1 and b2 are written into.

31. The gas flow meter according to claim 20, wherein said adjusting circuit includes an erasable and programmable storage device wherein the adjustment coefficients a, a1, a2, b, b1 and b2 are written into.

32. The gas flow meter according to claim 21,

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a data input/output circuit;

39. The gas flow meter according to claim 38, further comprising means which, after a predetermined number, two or more, of pulses have been supplied to one of the external data communication terminals of the data input/output circuit, allows the adjust circuit to enter into a data communication mode where it transfers data between the storage device and external circuits.

an adjusting circuit for adjusting a voltage output of a gas flow detection circuit which outputs a voltage signal representing a gas flow passing through a gas passage; and

wherein said adjusting circuit retrieves as the output signal of the detected gas flow a ratiometric analog output, a non-ratiometric analog output and a digital output and selects one of these output signals by an output selection means provided in the adjusting circuit.

the digital conversion circuit has means for selecting either a single-phase input or a differential input.

45. A gas flow meter comprising:

a gas flow detection circuit for detecting a current flowing through a resistor installed in a gas passage and a voltage generated across the resistor and outputting a voltage signal representing a gas flow passing through the gas passage;

a digital conversion circuit for converting the detected gas flow into a digital signal;

a digital adjusting circuit for digitally adjusting the digital signal and outputting the adjusted digital signal; and

an analog conversion circuit for receiving the adjusted digital signal and converting it into an analog signal;

wherein said analog conversion circuit is driven by a voltage based on an external reference voltage and a voltage follower circuit is arranged between a reference voltage terminal and a power supply terminal which drives said analog conversion circuit.

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